

CLAIMS

WHAT IS CLAIMED IS:

1. A jettable solution comprising:
a plurality of vesicles; and
a pharmaceutical payload associated with said vesicles.
2. The jettable solution of claim 1, wherein said jettable solution further comprises an edible vehicle, said plurality of vesicles being stably dispersed in said edible vehicle.
3. The jettable solution of claim 2, wherein said edible vehicle comprises one of water or an alcohol.
4. The jettable solution of claim 3, wherein said edible vehicle further comprises a solvent.
5. The jettable solution of claim 1, wherein said plurality of vesicles are formed from a lipid or a mixture of lipids selected from the group consisting of phosphatidylcholines, phosphatidylethanolamines, phosphatidic acids, phosphatidylserines, phosphatidylglycerols, cardiolipins, poly(ethylene glycol) lipid conjugates, sphingomyelins, cationic lipids, trioctanoin, triolein, dioctanoyl glycerol, cholesterol (ovine wool), lipid A (salmonella minnesota), purified lipid A, and dioleoyl-glutaric acid.
6. The jettable solution of claim 1, wherein said plurality of vesicles are formed from a plurality of di-block copolymers.
7. The jettable solution of claim 1, wherein said plurality of vesicles comprise dimensions of less than 10 microns.

8. The jettable solution of claim 1, wherein said pharmaceutical payload comprises a substantially water-insoluble pharmaceutical.

9. The jettable solution of claim 8, wherein said pharmaceutical payload is selected from the group consisting of Quinidex, Procainamide, Verapamil, Nitroglycerin, Quinidine, Calan, Disopyramide, Sotalol, Mexitil, Pindolol, Isosorbide 5-mononitrate, Cordarone, Digoxin, Nifedipine, Timolol, Dihydropyridine, Ethmozine, Rythmol, Acebutolol, Penbutolol, Nadolol, Diltiazem, Carteolol, Tambocor, Nicardipine, Captopril, Bepridil, Felodipine, Isradipine, Enalapril, Vasotec, Enalaprilat, Zestril, Esmolol, Univasc, Accupril, Quinapril, Lotensin, Benazepril, Altace, Trandolapril, Amlodipine, Monopril, Fosinopril, Moexipril, and Corvert.

10. The jettable solution of claim 1, further comprising a property enhancing agent.

11. The jettable solution of claim 10, wherein said property enhancing agent comprises one of a biocide, a viscosity modifier, a humectant, an antifoaming agent, a surface tension adjusting agent, a rheology adjusting agent, a pH adjusting agent, a drying agent, or a polymer.

12. The jettable solution of claim 1, wherein said solution comprises a viscosity of less than 5 centipoise.

13. The jettable solution of claim 1, wherein said solution comprises a surface tension between approximately 25 and 60 dynes per centimeter.

14. The jettable solution of claim 1, wherein said solution is configured to be selectively emitted from an inkjet material dispenser.

15. The jettable solution of claim 14, wherein said inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a

mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

16. The jettable solution of claim 1, further comprising:
approximately 25 % vehicle;
approximately 2 % vesicle forming component;
approximately 3 to 6 % pharmaceutical payload; and
water.

17. The jettable solution of claim 1, further comprising:
approximately 3.54 % vitamin E-succinate;
approximately 0.8 % Tris;
approximately 75.64 % water; and
approximately 20 % Diethylene glycol.

18. The jettable solution of claim 1, further comprising:
approximately 5 % 1,3propanediol;
approximately 3 % Brij30;
approximately 0.15% hexadecyltrimethylammonium bromide (HTAB);
approximately 1 % Cholesterol;
between 5 and 10 % pharmaceutical payload; and
water.

19. The jettable solution of claim 1, further comprising:
approximately 2.5 % egg yolk or Phosphotidyl choline Soy Lecithin;
approximately 1.0 % Cholic acid Na salt;
approximately 5 % Diethylene glycol;
approximately 5 % pharmaceutical payload; and
water.

20. The jettable solution of claim 1, further comprising:
approximately 5 % sucrosemono/di stearate;
approximately 5 % 1,3 propane diol;
approximately 5 % pharmaceutical payload; and
water.

21. A method for forming a jettable pharmaceutical solution comprising:
presenting a pharmaceutical
combining said pharmaceutical with a vesicle forming material and an aqueous vehicle; and
processing said combination to form a jettable solution including a plurality of vesicles containing said pharmaceutical.

22. The method of claim 21, further comprising grinding said pharmaceutical to a particle size of less than 200 nanometers.

23. The method of claim 22, wherein said grinding further comprises processing said pharmaceutical with a microfluidizer.

24. The method of claim 21, wherein said pharmaceutical comprises a substantially water insoluble pharmaceutical.

25. The method of claim 21, wherein said pharmaceutical is selected from the group consisting of Quinidex, Procainamide, Verapamil, Nitroglycerin, Quinidine, Calan, Disopyramide, Sotalol, Mexitil, Pindolol, Isosorbide 5-mononitrate, Cordarone, Digoxin, Nifedipine, Timolol, Dihydropyridine, Ethmozine, Rythmol, Acebutolol, Penbutolol, Nadolol, Diltiazem, Carteolol, Tambocor, Nicardipine, Captopril, Bepridil, Felodipine, Isradipine, Enalapril, Vasotec, Enalaprilat, Zestril, Esmolol, Univasc, Accupril, Quinapril, Lotensin, Benazepril, Altace, Trandolapril, Amlodipine, Monopril, Fosinopril, Moexipril, and Corvert.

26. The method of claim 21, wherein said vesicle forming material comprises a plurality of lipids.

27. The method of claim 26, wherein said plurality of lipids are selected from the group consisting of phosphatidylcholines, phosphatidylethanolamines, phosphatidic acids, phosphatidylserines, phosphatidylglycerols, cardiolipins, poly(ethylene glycol) lipid conjugates, sphingomyelins, cationic lipids, trioctanoin, triolein, dioctanoyl glycerol, cholesterol (ovine wool), lipid A (salmonella minnesota), purified lipid A, and dioleoyl-glutaric acid.

28. The method of claim 21, wherein said vesicle forming material comprises a plurality of di-block copolymers.

29. The method of claim 28, wherein said di-block copolymers comprise polyethyleneoxide-polyethylethylene.

30. The method of claim 21, wherein said aqueous vehicle comprises one of water or an alcohol.

31. The method of claim 30, wherein said aqueous vehicle further comprises a solvent.

32. The method of claim 21, wherein said combining said pharmaceutical with a vesicle forming material and an aqueous vehicle comprises mixing said pharmaceutical, said vesicle forming material, and said aqueous vehicle.

33. The method of claim 21, wherein said processing said combination to form a jettable solution including a plurality of vesicles containing said pharmaceutical comprises performing one of a mechanical

dispersion process, a micro-emulsification process, a sonication process, a membrane extrusion process, a microfluidization process, or an acute pressure valve homogenization (APV) process.

34. The method of claim 33, wherein said APV homogenization process comprises:

forcing said combination through a valve having a small orifice and an impact ring.

35. The method of claim 21, wherein said jettable solution is configured to be selectively emitted from an inkjet material dispenser.

36. The method of claim 35, wherein said inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

37. The method of claim 21, wherein said plurality of vesicles comprise a dimension of less than 10 microns.


38. The method of claim 37, wherein said jettable solution comprises a viscosity of less than 5 centipoise.

39. The method of claim 37, wherein said jettable solution comprises a surface tension between approximately 25 and 60 dynes per centimeter.

40. The method of claim 21, further comprising dispensing a property enhancing agent into said combination.

41. The method of claim 40, wherein said property enhancing agent comprises one of a biocide, a viscosity modifier, a humectant, an antifoaming

agent, a surface tension adjusting agent, a rheology adjusting agent, a pH adjusting agent, a drying agent, or a polymer.

42. A method for forming an oral pharmaceutical comprising: 
presenting an edible structure adjacent to an inkjet material dispenser;
and
selectively dispensing an aqueous vesicle pharmaceutical from said inkjet material dispenser onto said edible structure.

43. The method of claim 42, wherein said inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

44. The method of claim 42, wherein said selectively dispensing comprises dispensing a predetermined dosage of said aqueous vesicle pharmaceutical.

45. The method of claim 42, wherein said edible structure comprises one of a polymeric or paper organic film former.

46. The method of claim 42, wherein said aqueous vesicle pharmaceutical comprises a pharmaceutical payload enclosed within a liposome vesicle.

47. The method of claim 42, further comprising dividing said edible structure into a plurality of single oral doses.

48. The method of claim 42, further comprising selectively dispensing a plurality of aqueous vesicle pharmaceuticals onto said edible structure, said plurality of aqueous pharmaceuticals forming a combination therapy.

49. A system for dispensing an oral solution comprising:
an edible structure; and
a vesicle solution containing a pharmaceutical payload configured to be dispensed onto said edible structure.

50. The system of claim 49, wherein said edible structure comprises one of a rice starch based paper, a potato starch based paper, or an edible polymer.

51. The system of claim 49, wherein said vesicle solution comprises vesicles formed from one of a liposome or a polymersome.

52. The system of claim 49, further comprising:
a computing device disposed adjacent to said edible structure;
an inkjet material dispenser communicatively coupled to said computing device; and
a material reservoir fluidly coupled to said inkjet material dispenser, said material reservoir being configured to supply said liposome vesicle solution containing a pharmaceutical payload to said inkjet material dispenser.

53. The system of claim 52, wherein said computing device comprises one of a personal computer, a laptop computer, a personal digital assistant, or a cellular telephone.

54. The system of claim 52, wherein said inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

55. A jettable solution comprising:
a water insoluble pharmaceutical payload; and
a means for encapsulating said pharmaceutical payload into a jettable solution.

56. The jettable solution of claim 55, wherein said jettable solution further comprises a means for stably dispersing said encapsulated pharmaceutical payload.

57. A system for dispensing an oral solution comprising:
an edible means for receiving a pharmaceutical payload solution; and
a liposome vesicle solution containing a pharmaceutical payload configured to be dispensed onto said means for receiving a pharmaceutical payload solution.

58. The system of claim 57, wherein said edible means for receiving a pharmaceutical payload solution comprises one of a rice starch based paper, a potato starch based paper, or an edible polymer.

59. The system of claim 58, further comprising:
a means for computing disposed adjacent to said edible structure;
a means for selectively dispensing said pharmaceutical payload solution communicatively coupled to said means for computing; and
a material reservoir fluidly coupled to said means for selectively dispensing said pharmaceutical payload solution, said material reservoir being configured to supply said pharmaceutical payload solution to said inkjet material dispenser.